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(पहला पुनरीक्षण)

Indian Standard

RECOMMENDATIONS FOR CATTLE HOUSING IN RURAL AREAS

(First Revision)

ICS 65.040.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Livestock Feeds, Equipment and System Sectional Committee had been approved by the Food and Agriculture Division Council.

Proper housing is an important feature in raising the production capabilities of animals, in addition to good breeding, feeding, selection and disease control. It is conducive to good health, comfort protection from inclement weather and the animals are capable of utilizing their genetic abilities and feed for optimum production.

Cattle raising and dairying is practiced in the country by various interests. Generally these interests are : (a) an average farmer who has not more than a pair of bullocks and two or three milch animals with their calves; (b) a rural milk producer normally having a total of about 20 animals including about 12 milch animals, their followers and a pair of bullocks; (c) *GAUSHALAS* and other organized milk producers; and (d) large dairy farms.

This standard was published in 1986, covering recommendations for cattle housing for rural milk producer. This revision has been taken up to enlarge the scope of the standard by incorporating the recommendations for cattle housing for an average farmer (IS 11786:1986 'Recommendations for cattle housing for an average farmer') and updating the referred standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

RECOMMENDATIONS FOR CATTLE HOUSING IN RURAL AREAS

(First Revision)

1 SCOPE

This standard covers recommendations for layout and constructional details of a cattle shed meant for an average farmer normally having three milch animals with their calves and a pair of bullock and rural milk producer normally having 20 animals which may include about 12 milch animals, their followers and a pair of bullocks.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
258 : 2000	Potash alum — Specification (*second revision*)
712 : 1984	Specification for building limes (*third revision*)
797 : 1982	Common salt for chemical industries (*third revision*)
3583 : 1988	Specification for burnt clay paving bricks (*second revision*)
3622 : 1977	Specification for sand stone (slabs and tiles) (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Paddock or Yard — An open area surrounded by walls, fences or rails for accommodating cattle. This area is meant to provide open air exercise to the animals. It generally contains manger(s) or trough(s) with or without ties to control animals for different purpose.

3.2 Standard (Stall) — The floor space provided within a shed for an individual animal to stand or lie.

4 SELECTION OF SITE

4.1 The shed shall be located on dry, elevated and well-drained area with consideration for future expansion.

4.2 The shed shall preferably be located at a place where there are enough suitably placed trees to serve as wind-breaks and to provide shade. In order to break the wind, it is recommended that a row of trees be also planted across the directions of wind at the boundary of the farm.

4.3 The site shall be away from public road but easily accessible throughout the year.

4.4 The site shall be such that arrangement could be made for adequate and good water supply.

4.5 The site shall be such that the long axis of the shed could be oriented east to west in all areas except temperate Himalayan and hilly regions. In desert areas, the shed shall be oriented across the prevailing direction of the wind in order to protect the roof from being blown off by high wind.

4.5.1 In coastal areas the shed shall be oriented along the prevailing wind direction in order to protect the roof from being blown off by high wind and at the same time to provide sufficient air movement in the shed. In sub-mountainous region, the buildings should be so sited as to avail of the natural aeration and drying.

5 HERD SIZE

A typical herd for an average farmer has been assumed to have about 5 animals comprising 3 milch animals, their followers and a pair of bullocks whereas for rural milk producer it is about 20 animals comprising 12 milch animals of which about 8 may be in milk. The remaining eight animals may include the followers of adult animals and a pair of bullocks.

6 SHED AND LAYOUT

6.1 For an Average Farmer

An average farmer having not more than three milch animals with calves and a pair of bullocks generally makes use of an existing wall for constructing the cattle shed. The construction of shed under this interest, therefore, has been suggested assuming that a lean to type roof could be built against an existing wall. Arrangement of adequate water supply and light shall be made in the shed. The typical layout of such a shed to accommodate five animals is shown in Fig. 1. The two side walls should be of height not more than

1.2 m. The height of main wall (*see A* in Fig.1) shall be minimum of 2.5 m.

6.2 For a Rural Milk Producer

The shed shall consist of standings for accommodating adult animals and the young stock. At the far end of the shed, there shall be a room for accommodating calves and a separate calving box. The paddock or yard for adult and young stock and calves may be separate on either side of the standings. The calves and the down calver shall have separate paddocks or yards for themselves laid adjacent to the calf room and calving box.

6.2.1 The layout and overall dimensions of each of the units (*see* **6.2**) may be as given in Fig. 2 and Fig. 3.

7 CONSTRUCTION

7.1 Standing

For an average farmer the standings shall be constructed in such a way that the animals are kept facing towards the wall. The manger shall be adjacent to the wall. The length, width and area of cow shed and buffalo shed capable of accommodating one to four cattle is given in Table 1.

For a rural milk producer the standings shall be constructed in such a way that the animals are arranged in rows. The length and width of each standing shall be decided depending upon the size of the animals. The length and width of each standing shall be decided depending upon the size of the animals. The length and width of each standing may vary from 1.5 m to 1.7 m and 1.0 m to 1.2 m per animal respectively. In coastal region, sometimes buffaloes with spreading horns are found; in that case the width per animal may vary from 1.2 m to 1.3 m.

7.1.1 *Floor of Standings*

The floor may be either of *MOORUM KANKAR* and sand, cement concrete, stone slabs or bricks-on-edge. The details of laying these floorings may be as given in Annex A. A plinth of at least 15 cm shall be provided for the floor. The surface of the cement concrete or stone flooring shall be grooved to make it non-slippery for animals. For larger animals, the grooves shall be formed in a square of 15 cm × 15 cm and for calves 10 cm × 10 cm (*see A* in Fig. 4). The width of the groove shall be 12 mm and depth 10 mm. The groove shall be of 'U' shape. A slope of 1 in 60 towards the drain shall be provided in order to keep the floor properly drained after washing. Steel rings may be provided on the floor near the manger for tying the animals.

7.1.2 *Manger*

The manger shall be continuous type. The manger shall be made of stone slabs, wooden plank or brick-in-lime or cement mortar. The flooring material of the manger shall be the same as for the floor but the surface shall be finished smooth. All the corners of the manger shall be rounded off and finished smooth. The dimensions of the manger (*see* Fig. 5) shall be as given in Table 2. In case the mangers are of brick, the fore curb should be topped with angle iron.

7.2 Walls

The wall shall be of brick or stone slab laid in cement mortar. The wall may be cement-plastered from inside. The thickness of the wall shall be at least 20 cm. All walls shall be solid up to 1.25 m height from the floor level and shall be constructed in honey comb pattern above that height in order to provide sufficient air movement in the shed. The rest of the portion of the wall may be left open by a series of wire-netted windows. In desert areas, the solid portion may extend up to 1.8 m in height. In case of lean-to type system, the end walls above the solid portion may be left open or provided with a series of wire-netted windows.

Table 1 Space Norms for Cattle Shed

(*Clause* 7.1)

All dimensions in metres.

No. of Cattle	Cow Shed		Buffalo Shed		Remarks
	Length	Width	Length	Width	
(1)	(2)	(3)	(4)	(5)	(6)
1	2.5	3.0	2.7	3.4	Along with calf
2	4.2	3.0	5.2	3.4	Along with calves
3	5.7	3.0	7.3	3.4	Along with calves
4	5.6	3.0	6.8	3.4	For cattle
	2.0	1.5	2.4	1.9	For calves

7.3 Pillars

One pillar shall be placed at intervals of every two or three standings depending on the width of each standing. Pillars may be made from any of the following materials and their minimum dimensions shall be as indicated against each:

a) Brick	45 cm × 35 cm (*see* Note 1) or 40 cm × 30 cm (*see* Note 2)
b) Mild steel I section	10 cm × 10 cm
c) Stone masonry	30 cm × 30 cm
d) Iron pipes, dia	10 cm
e) Timber	
1) Square	10 cm × 10 cm
2) Round	15 cm dia

NOTES

1 In case of 22.5 cm × 11.25 cm brick, 2 lengths and 3 widths shall be used.

2 In case of 20 cm × 10 cm (modular) brick, 2 lengths and 3 widths shall be used.

3 All iron structures shall be suitably painted for protection against corrosion.

7.3.1 All edges in rectangular pillars shall be rounded off a finished smooth.

7.4 Roof

The roof shall be of lean-to type or gabled type. The roof material may either be asbestos cement sheets, galvanized steel sheets, asphalt roofing material; or locally available material. Where necessary, particularly in hot climate, asbestos cement or galvanized steel roofs may be overlaid with a 8 cm to 10 cm thick thatch to lessen the stress of extreme climate. In areas where locally available materials are used, gunny sacks treated with cement lime mixture (*see* **7.4.1**) may be used. The roof shall be supported by steel or wooden trusses or by a series of central pillars. The pitch of the roof may range from 22 to 30 degrees depending upon the material used. Wooden purlins may be spaced up to 1.3 m apart. The eaves of the roof shall project out (*see A* in Fig. 2 and 3) at least 50 cm away from the pillars and in the regions where extreme climatic conditions prevail, the eaves of the roof may project out to 75 cm from the pillars in order to afford protection to the animals from direct sun and rain. The eaves should be 2.2 mm high from ground level (*see B* in Fig. 2 and 3).

7.4.1 *Preparation of Cement Lime Mixture*

Stir thoroughly 12 parts by volume of cement and three parts by volume of lime (*see* IS 712) salt (*see* IS 797) and one-half part by volume of alum (*see* IS 258) and stir until all ingredients are well mixed. Apply the mixture evenly with the help of a brush on the inner surface of the gunny sack. Give

Table 2 Dimensions of Manger

(*Clause* 7.1.2)

All dimensions in centimetres.

Sl No.	Particulars	Stone Slab	Wooden Plank	Brick Laid in Cement or Lime	Ref to Fig. 1
(1)	(2)	(3)	(4)	(5)	(6)
i)	Height of the manger wall, *Min*	75	75	75	*A*
ii)	Height of fore curb, *Max*				
	a) For adults	50	50	50	*B*
	b) For calves	30	30	30	*B*
iii)	Thickness of fore curb, *Min*	4	3	10	*C*
iv)	Inner width of the manger, *Min*				
	a) For adults:				
	1) One way feeding	60	60	60	*D*
	2) Two way feeding	120	120	120	*D*
	b) For calves: one way feeding	40	40	40	*D*
v)	Depth of manger, *Min*:				
	a) For adults	40	40	40	*E*
	b) For calves	15	15	15	*E*

two coats of the mixture on the outer surface of the gunny sack. Stretch the gunny sack and dry in the sun until it becomes stiff.

7.5 *Drains*

The drain shall be laid in the shed at the back of the standing. In case of gabled type roof, two drains shall be laid outside the shed, one on each side of the standing. The drain shall be made of brick in cement mortar or of stone and shall be of 'U' shape with a depth of 6 cm at the bottom. The slope of the drain shall be 1 in 40 to 1 in 60. The width of the drain (*see* *C* in Fig. 2 and 3) may vary between 30 cm and 40 cm. The drain may be led to a common urine pit having a depth not exceeding 40 cm or to the field if slope permits. The urine pit may be circular or rectangular.

7.6 Special Constructional Requirements for a Rural Milk Producer

7.6.1 *Water Supply*

There shall be an adequate supply of potable water in the shed. For this purpose, a trough of reinforced cement concrete or brick-in-cement should be provided. The size of the trough shall depend upon the daily requirement of water calculated at the rate of 50 litres per livestock per day. The water troughs should be provided with railing on its sides so that the animals may not try to step in the water trough and contaminate it.

7.6.2 *Calf-Room*

A part of the standing at the far end of the shed shall be partitioned suitably for housing calves. Generally, a floor space of 1.2 m² to 1.5 m² is recommended per calf. There shall be a manger adjacent to the wall of the room. A wall covering half the height of the room shall be provided in order to separate the calf-room from its adjoining yard.

7.6.3 *Calving-Box*

A separate unit shall be provided for housing one down-calver. The calving-box shall be adjacent to the calf-room and at the end of the standings. The box shall be separated from the calf-room as well as from the rest of the shed by a suitable partition. The dimensions of the calving-box shall be 2.8 m × 4 m. There shall be cement concrete manger and water trough in one corner of the box. The width of the manger and the water trough shall be at least 60 cm.

8 OTHER REQUIREMENTS FOR A RURAL MILK PRODUCER

8.1 Paddock or Yard

8.1.1 The design of the paddock or open yard may be made while using the common wall of the residence of the average farmer. There shall be a paddock with the following minimum space per animal for various categories of animals:

a)	Buffalo	8 m²
b)	Cow	7 m²
c)	Young stock	4 m²
d)	Calf	2 m²
e)	Calving	12 m²

8.1.2 There shall be feeding and water troughs within the paddock.

8.2 Fencing

8.2.1 The wall of bricks or stone slabs or a railing or wires may constitute fence. The railings may be of 35 mm galvanized iron pipe or 5 mm galvanized iron wire and posts to support railings. The posts may be of 5 cm steel pipe, 6 cm × 4 cm angle iron, 8 cm × 5 cm stone slabs or 10 cm × 10 cm timber placed 2 m apart. The posts shall be holed to pass the railings through or it may be riveted or 'U' bolted to the place.

8.2.1.1 The railings for different categories of the animals shall be fixed with the posts as given below:

Height from Ground to Centre of Each Rail	*Calves* cm	*Cows, Young Stock and Buffaloes* cm	*Bull* cm
First rail	30	40	40
Second rail	60	80	80
Third rail	90	120	120
Fourth rail	120	–	150

8.2.2 The wooden horizontal braces or steel horizontal braces shall be placed as given in Fig. 6. Braced steel end or corner posts shall be embedded as given in Fig. 7.

8.3 Ancillary Structure

8.3.1 Provision of milk recording room and ration room, each of approximately 9 m^2, preferably at fore end of the shed, may be made.

9 LIGHTING

Provision of lighting shall be made. In case electricity is available, 125 W bulb for each 10 m^2 floor space or 60 W bulb for each 25 m^2 space or equivalent fluorescent tube light may be provided.

10 WASTE HANDLING

It is suggested that bio-gas plant of suitable size should be installed. The animal waste should be removed from standing/dung alley either by scrapping or direct collection in hand push cart or animal cart and taken to feed the bio-gas plant.

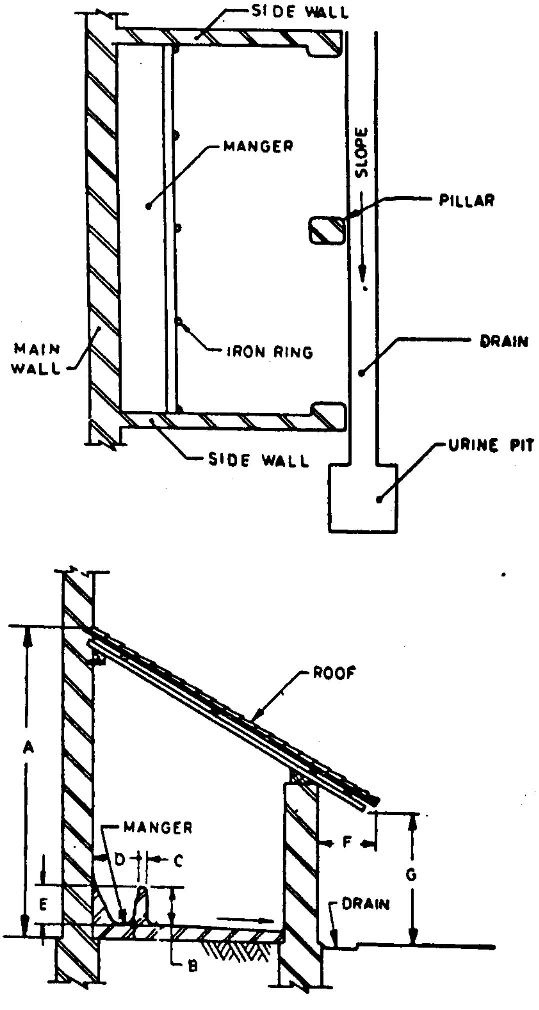


Fig. 1 Typical Layout of Farm Cattle Shed

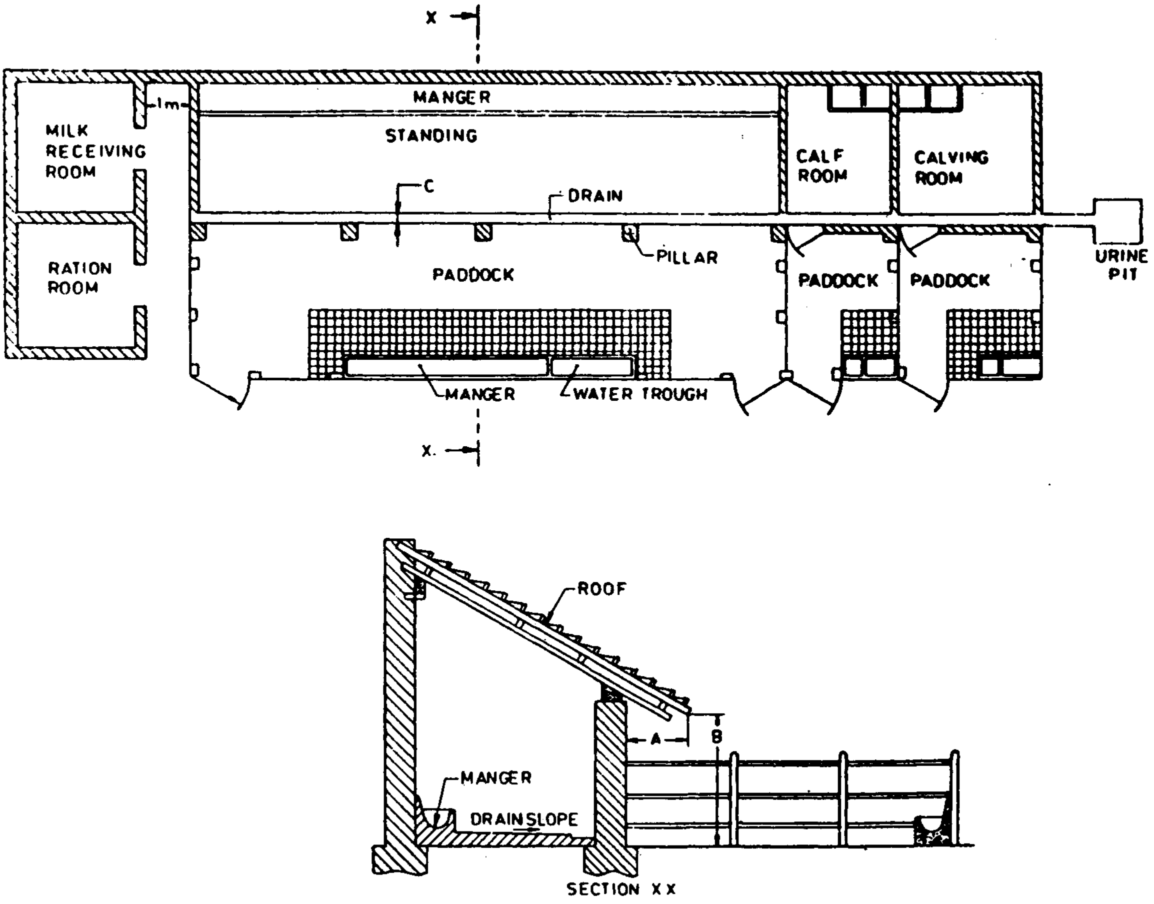


FIG. 2 A TYPICAL LAYOUT OF SHED, LEAN-TO TYPE ROOF

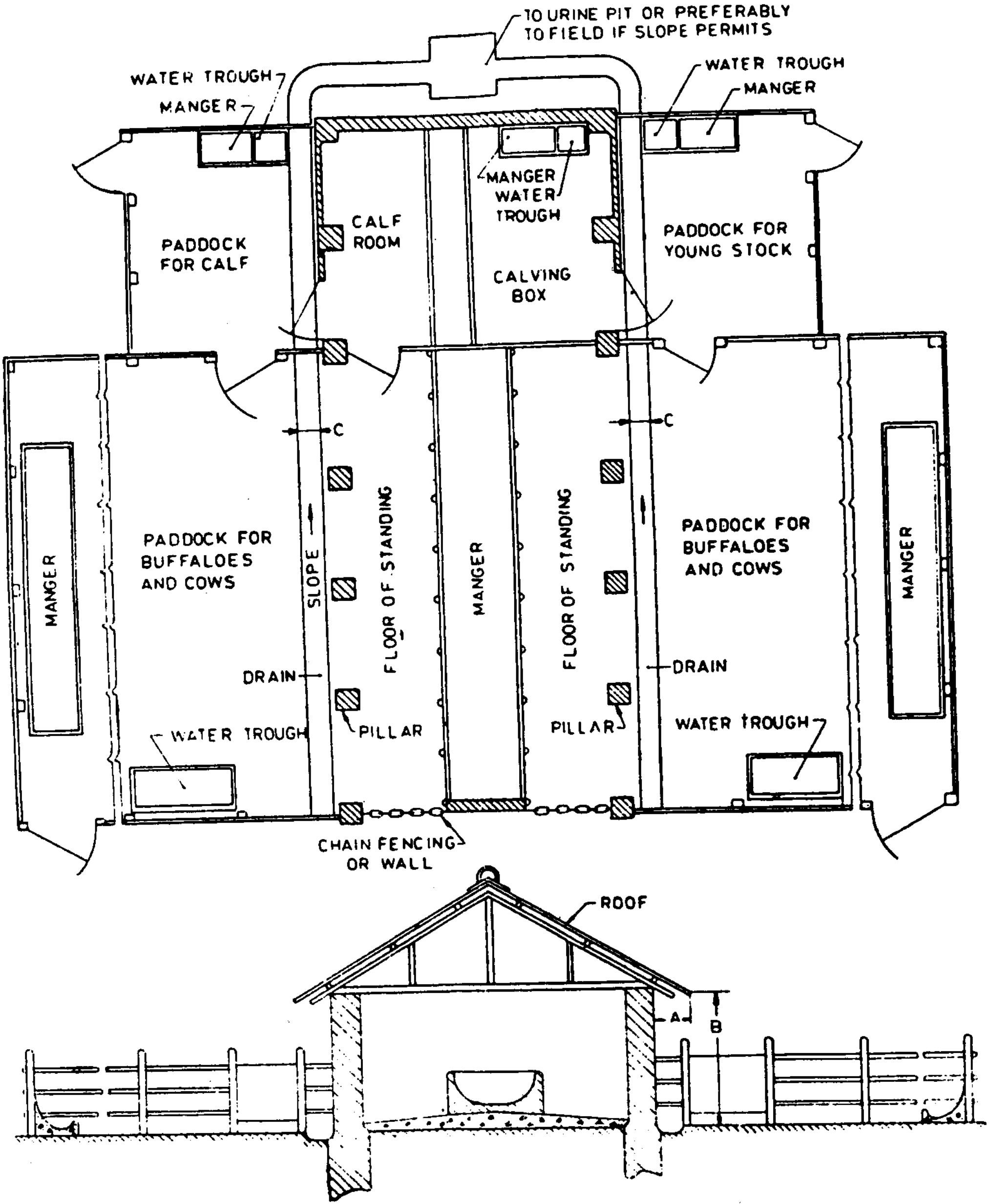
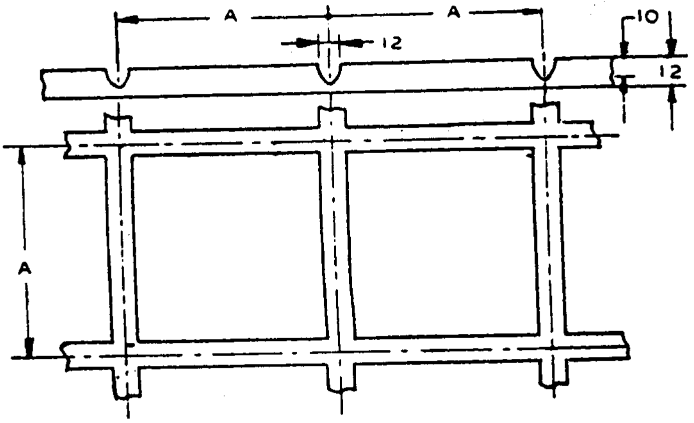
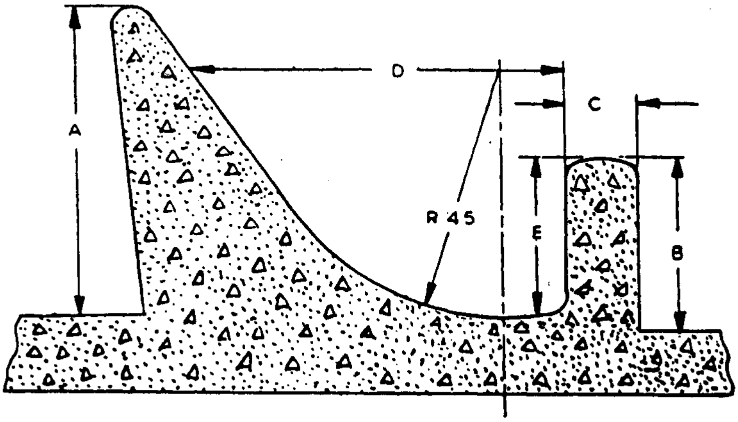


FIG. 3 A TYPICAL LAYOUT OF SHED, GABLED TYPE ROOF



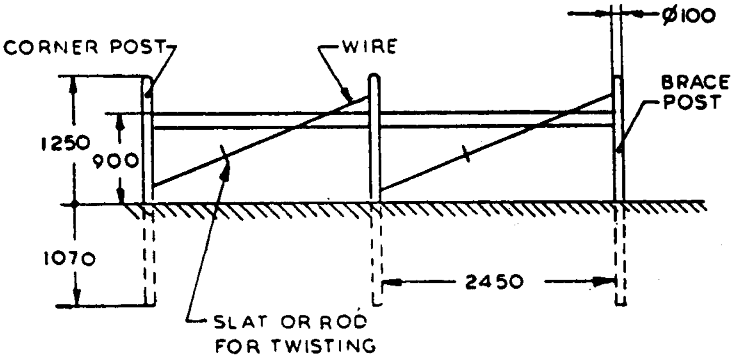
All dimensions in millimetres.

FIG. 4 CROSS-SECTION OF STANDING



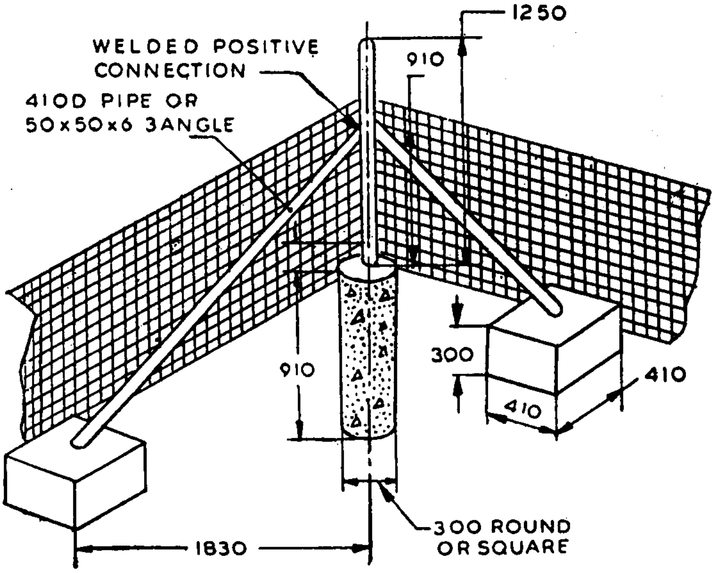
All dimensions in millimetres.

FIG. 5 CROSS-SECTION OF MANGER



All dimensions in millimetres.

FIG. 6 WOOD OR STEEL HORIZONTAL BRACES



All dimensions in millimetres.

FIG. 7 BRACED STEEL END OR CORNER POST

ANNEX A

(*Clause* 7.1.1)

DETAILS OF LAYING DIFFERENT TYPES OF FLOORING OF STANDINGS

A-1 *MOORUM, KANKAR* AND SAND FLOORING

The *moorum*, *kankar* and sand flooring shall be laid over a subgrade or rubble packing or broken bricks of 15 to 25 cm thick wetted and well rammed. A 15 cm layer of hard *moorum*, *kankar* and sand (as the case may be) shall be laid over this subgrade with coarser pieces at the bottom and fine ones over at the top. A layer of powder *moorum*, *kankar* and sand about 3 to 5 cm shall be spread over the top of this layer. Water shall then be sprinkled and the surface shall be well rammed. Water shall again be sprinkled until the floor is fully saturated. The surface shall be rammed, leveled and well consolidated. When the floor is dry, a thick paste of cow dung plaster shall be uniformly spread and it shall be well rammed. A final thin coating of mixture of cow dung (four parts) and cement (one part) shall be applied after the floor has dried up and wiped clean to prevent cracking and panelling. The cow dung plaster shall be applied weekly or fortnightly to keep the floor in good condition.

A-2 BRICK ON EDGE FLOORING

A-2.1 The subgrade for this type of flooring shall be rubble or brick aggregates which shall be hand packed, watered and well rammed. A layer of 10 cm of lime concrete shall be spread over the subbase, well rammed and shall be allowed to set for 7 days. The bricks shall be well burnt and of good quality (*see* IS 3583) and shall be well soaked in water before laying. Bricks shall be laid on about 10 mm thick cement or lime mortar bed and each brick shall be properly bedded on edge and set home by gentle tapping with the handle of trowel or a wooden mallet. Its inside faces shall be buttered with mortar before the next brick is laid and pressed against it. On completion of a portion of flooring the vertical joints shall be fully filled from the top with the mortar.

A-2.2 The surface of the flooring during the laying shall be frequently checked with a straight edge at least 2 m long so as to obtain a true surface with the required slope. The surface of the flooring shall be kept constantly moist for a minimum period of 7 days. In the case of fat lime mortar, curing shall commence two days after the laying of the flooring and shall continue for 7 days. The bricks may be laid in rows having the joints parallel and at right angles to the walls or in 'herringbone' pattern.

A-3 STONE SLAB FLOORING

A-3.1 The stone slabs shall be of good quality, hard, sound and dense (*see* IS 3622). Apart from sandstone any other good quality stone slabs may be used according to the availability of the material. The subgrade shall be prepared as given in **A-2.1** and the lime concrete bed shall be cleaned, wetted and mopped. The bedding for the slabs shall be made with cement mortar 1:4 (1 cement : 4 coarse sand) or with lime mortar (either 1 lime putty : 1 surkhi : 1 coarse sand or 1 lime putty : 2 coarse sand). The average thickness of the bedding mortar under the slab shall be 20 mm. The mortar shall be spread under the area of each slab to the specified thickness. The stone slab shall be washed clean before laying. It shall be laid on top, pressed, tapped with wooden mallet and brought to level with the adjoining slabs. It shall be lifted and laid aside. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows. The edges of the slab already paved shall be buttered with cement slurry. The slab to be paved shall be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab with as fine joints as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slab shall be cleaned off. The flooring shall be cured for a minimum period of 7 days. The surface of the flooring as laid shall be true to a level and shall be of the desired slope. Slight unevenness at the meeting edges of slabs shall be removed by fine chiseling.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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